Oven with blower assisted circulation promoting more uniform heating and browning even at lower air flow rates

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Cited documents:
DE3621245 (C2)
DE3116183 (C2)
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Abstract of **DE 19831087 (A1)**

The sheet metal air duct (15) baffles (33) direct hot airflow to outlet openings (19). Baffle design promotes laminar airflow along its surfaces at high velocities. At lower velocities, flow separates from them, becoming turbulent. Preferred features: Baffles are integral to the duct, extending over its depth. They extend from the inlet or suction opening (17) to the outlet opening (19). During baking, speed control operates the motor longer at high speed than at low, i.e. for about twice the time. The baffle is designed to differentiate turbulent and laminar flow directions, especially by more than 15 deg . An air heater encircles the blower rotor; spacing between heater and rotor is less than that from the baffle. The air duct is separately claimed.

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1. Oven with a bakery with a fan for rolling the hot air over in the bakery, which fan a rear air deflector panel with at least a suction port and a blow-out port is arranged, and with a control unit, which exhibits the speed of the motor and thus the fan during the rolling over enterprise varied, propelled by a motor, characterised in that the air deflector panel (15) flowflat (33), which the hot air to the blow-out ports (19) lead, and that the flowflat (33) are in such a manner designed that with a large flow rate the air flow along-flows essentially more laminar at the flowflat, and that itself with a smaller flow rate the air flow essentially turbulent of the flowflat (33) solves.

2. Oven according to claim 1, characterised in that the flowflat (33) integral with the air deflector panel (19) formed are.

3. Oven according to claim 1 or 2, characterised in that itself the flowflat (33) essentially over the depth of the air deflector panel (15) extended.

4. Oven after one of the preceding claims, characterised in that itself the flowflat (33) of the region of the suction port (17) up to the blow-out port (19) extended.

5. Oven after one of the preceding claims, characterised in that the control unit (13) the motor (9) during the procedure longer time with the large speed steers, in particular at least twice as prolonged as with the small speed.

6. Oven after one of the preceding claims, characterised in that the flowflat (33) in such a manner designed is that the flow direction of the laminar flow (35) differs from that the turbulent flow (37), in particular around more than about 15 DEG.

7. Oven after one of the preceding claims, characterised in that an air heating element (16) impeller (11) moves, and that the distance of the air heating element (16) of the impeller (11) is smaller as from the flowflat (33).

8. Air deflector panel with at least a suction port and blow-out ports, characterised in that the air deflector panel (15) flowflat (33) exhibits, which the air flow to the blow-out ports (19) lead, and that the flowflat (33) are in such a manner designed that with a large flow rate the air flow along-flows essentially more laminar at the flowflat, and that with a small flow rate the air flow essentially turbulent from the flowflat (33) separate.

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The current invention concerns an oven with a bakery with a fan propelled by a motor for rolling over the hot air in the bakery, which fan a rear air deflector panel with at least a suction port and a blow-out port is arranged, and with a control unit, those the speed of the motor and thus the fan during the rolling over enterprise varied, and a corresponding designed air deflector panel.

A such oven is known from the document DE 31 16 183 C2, whereby the blower drive motor over a switching device an electric pre-resistor is connectable for the reduction of the engine speed. The pre-resistor is in the course of the entire procedure or a part of it upstream in the same or unequal timing.

Object of the current invention is it to make an oven available after the preamble of the claim 1 its heat distribution when rolling the hot air over in the bakery improved and/or. is comparison-moderate.

This with an oven after the preamble of the claim 1 by the fact achieved is according to invention that the air deflector panel exhibits flowflat, which lead the hot air to the blow-out ports, and that the flowflat are in such a manner designed that with a large flow rate the air flow along-flows essentially more laminar at the flowflat, and that with a smaller flow rate the air flow essentially turbulent from the flowflat separate. Surprisingly experimentiell found became that according to invention an even browning and/or. Fermentation of the good is more achievable. With the state of the art arising local limited Überhitzungsstellen at the good can become by alternate blowing out laminar and turbulent flow as far as possible from the blow-out port avoided. Results according to invention an uniform optimum brown picture, which essentially independent of placing the good in the cooking chamber and/or. the number the used good-inertial in the cooking chamber is.

Manufacturing and assembly-technical particularly favorable is it, if the flowflat are integral formed with the air deflector panel.

Favourable way extended itself the flowflat essentially over the entire depth of the air deflector panel and/or. the blow-out port. By the fact is achieved that the entire air flow required into the cooking chamber before the air deflector panel is essentially influenced according to invention.

The brown result designed itself particularly favorable, if the flowflat itself of the region of the suction port up to the blow-out port extended.

In accordance with a preferable embodiment the control unit steers the motor longer time with the large speed, in particular at least twice as prolonged as with the small speed. By alternate steering of the motor with the two different speeds, whereby the motor runs more prolonged with the large speed, an even brown picture becomes achieved with certain recipes. This applies in particular to bulky courts as for example a chicken or a duck.

Favourable way is the flowflat in such a manner designed that the flow direction of the laminar flow differs from that the turbulent flow, in particular around more than about 15 DEG. By the continuous change of the inclination of the flow direction to horizontal becomes an excellent, uniform brown picture and a good refining result achieved, since due to the continuous alternate flow direction of the hot air that becomes good with the time generally uniform without Überhitzungsstellen of the hot air applied.

Case an air heating element impeller moves, is favourable it, if the distance of the air heating element of the impeller is smaller as from the flowflat. A too large approach of the air heating element to the flowflat has adverse effects on the defined flow attitude of the hot air and thus on the brown result and/or. the uniform degrees of the good.

Subsequent one is on the basis schematic representations an embodiment of the oven according to invention and the air deflector panel according to invention described.

Show:

Fig. 1 strong simplified in a top view partly in a sectional view the oven,

Fig. 2 in a perspective view from the front the air deflector panel and

Fig. 3 in a view from in the back the air deflector panel in accordance with Fig. 2 strong simplified.

An oven in accordance with Fig. 1 with an housing not shown more near exhibits a quaderförmige, front open Backofenmuffel 1, which is by opposite side walls 3, a rear wall 5 as well as a soil and a top wall limited. The Backofenmuffel 1 is front by an hinged Ofentür 7 lockably. Between the housing and the Backofenmuffel 1 the rear rear wall 5 a motor 9, in particular a shaded-pole motor, is arranged. This turns 1 rising up motor shaft an actual known impeller 11 by means of by the rear wall 5 into the muffles. The motor becomes 9 of a control unit 13 of the oven

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dependent of the mode controlled set over operating elements. In particular the motor becomes 9 alternate with an high and a low speed operated, as subsequent explained is. Parallel to the rear wall 5 is into the Backofenmuffel 1 an air deflector panel 15 supported. This the divided Backofenmuffel 1 into a cooking chamber located before the air deflector panel 15 and a receiving space 31 (Fig planned between the rear wall 5 and the air deflector panel 15. 1, 2) for impeller the 11. This is moved of an actual known annular air heating element 16. Further the muffle 1 can be also still different heating elements, as for example an upper and a bottom heat associated.

The air deflector panel 15 points in accordance with Fig. 2, 3 arranged numerous small suction ports 17 and two in the side region of the air deflector panel 15 intended blow-out port 19, central in a kreisflächenförmigen region, up. The rectangular blow-out ports 19 are together with the rear wall 5 the Backofenmuffel 1 formed. The air deflector panel 15 possesses itself in its upper and lower end portion one over its whole width extending mounting flange 21. In this altogether four mounting holes 23 are for fastening the air deflector panel 15 at the rear wall 5 the Backofenmuffel 1 provided. Of the flange 21 forward remote extended itself parallel in addition a main plate 25 with the suction ports 17. The main plate 25 is 29 connected with the flange 21 over a bent, dachförmigen upper disk edge 27 rectangular of the main plate 25 and a lower disk edge. Thus is between the air deflector panel 15 and the rear wall 5 the receiving space 31 formed, like described above.

At the underside of the upper disk edge 27 and at the top of the lower disk edge 29 each other opposite two airfoil-like flow sheet metals are 33 15 fixed at the air deflector panel. These extend over the entire depth of the air deflector panel 15. Technically particularly favorable is it, if the flow sheet metals are 33 integral 15 formed with the air deflector panel. In Fig. 3 not represented air heating elements 16 is in the circular edge region of the suction ports 17 arranged, if the air deflector panel is 15 5 mounted at the rear wall. Thus the distance of the air heating element 16 smaller to the impeller 11 is than to the flow sheet metals the 33.

In the operation of the oven the control unit 13 heads for the motor 9 first for example with a higher speed. Thus that sucks impeller 11 from the cooking chamber through the suction ports 17 a maximum amount at air into the receiving space 11 the rear Luftleiblech 15. The sucked air becomes radial outward pressed and flows due to the sufficient high flow rate as a laminar flow 35 in a certain angle to horizontal lateral from the blow-out ports 19. To a defined time the control unit 13 changes the speed to a lower speed. The flow sheet metals 33 the moving by flow of air exhibits one in such a way low speed that it tears 37 from the airfoil 33 off as a turbulent flow. The turbulent flow 37 exhibits a mainstream direction, whose angle is smaller to horizontal the substantial, as that the laminar flow 35. The direction of rotation of the fan 11 is 39 displayed thereby by a direction of rotation arrow (Fig. 3). By continuous changes of the speed a continuous defined alternate flow direction of the hot air is caused. This change has an uniform brown picture to the sequence, essentially independent of the size and type of the good and the number of the used good-inertial in the cooking chamber.